



Why Does Mindfulness Create Resilience in Patients with PTSD and Addictions: A Summary of 3,000 Years of Wisdom and Current Evidence Based Science

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Introduction

Resilience is the capacity to withstand stress and catastrophe. Psychologists and philosophers have long recognized the innate capabilities of humans to adapt and overcome risk and adversity. Being resilient does not mean passing through life without experiencing stress and distress. Humans naturally experience grief, sadness, and a range of other emotions after adversity and loss. However, when the right social support structures are in place, individuals and communities are able to rebuild their lives even after devastating events including addiction and PTSD.

The characteristics of resiliency include intellectual mastery and curiosity, compassion with detachment, and the ability to conceptualize and attain the conviction of one's own right to survive [1]. Further, an ability to imagine, remember and invoke positive images, as well as having a goal to strive toward is also identified as resiliency characteristics. Other such characteristics include attracting and utilizing appropriate support, creating a vision to restore moral order, possessing the ability and willingness to assist others, having a sense of true self and developing a heart-centred fighting spirit [2].

Mindfulness is usually regarded as involving two concepts: awareness of and attention to the present moment and acceptance without judgment. Creating an awareness of present moment means that an individual observes his or her feelings, thoughts and sensations and directs these to the current moment. Attending to a current moment requires adopting a stance of willingness and acceptance so that one can experience emotions and thoughts without judgment [3].

While, on the whole, humans are capable of exhibiting great resilience to adversity, exposure to the ravages of war places soldiers in a particularly high-risk category for developing and addiction or PTSD. Recent statistics on the Iraq and Afghanistan wars show that PTSD and other mental health issues pose some of the most significant health challenges for veterans. Currently, prevalence of PTSD among Iraq War veterans is estimated to be as high as 20% [4]. However, since symptoms often take months or years to appear, that figure is expected to rise and future projections place the rate of PTSD in this group of veterans in the range of 35% [4]. This would closely correlate with, and potentially surpass, the 30.9% lifetime prevalence of PTSD among male Vietnam War veterans.

Untreated, PTSD leads to tragic and costly consequences including addiction. Army suicide rates reached a 30-year high in 2008, having more than doubled since 2001 [5]. This trend, which has been claiming more lives than those lost in combat, is expected to continue into the foreseeable future. Among Vietnam veterans with PTSD, 34.2% have been arrested or jailed at least once and 11.5% have been convicted of a felony [5]. PTSD has also been found to impair cognitive function.

Substance abuse and addiction are rampant among veterans with PTSD; with lifetime alcohol abuse among male Vietnam veterans running at 39.2% [4]. The two conditions occurring simultaneously confound clinicians' efforts to effectively treat either one [6].

These illustrate just a few of the long and growing list of physical and mental health effects of PTSD, including addiction, all of which urgently require more accurate identification as well as more effective treatment approaches in order to bring much-needed hope and healing to veterans with PTSD. The purpose of this paper is to conduct a qualitative research review on how mindfulness has been used as a way to help veterans with PTSD or addiction build resilience. To achieve this objective, this paper will examine a variety of published studies, experiments and notable developments on the subject.

Resilience and Mindfulness

The practice of mindfulness is rooted in reflective traditions that seek increased awareness through meditation. The main aim of mindfulness is to cultivate an attitude of compassion and curiosity to the present moment. Recent years have seen more western mental health treatment programs and researchers including mindfulness in their treatment proposals. How does a culture of mindfulness create resilience in military veterans, particularly given the increasing numbers of veterans presenting to the VHA seeking treatment for post-traumatic stress disorder? Proponents have suggested that mental training, especially through meditation and similar practices that encourage the individual to safely explore his or her inner life, produces significant changes in emotion and cognition.

Mindfulness involves a wilful and purposeful approach to regulating one's attention, either for purposes of self-exploration and relaxation or transcendence and personal growth. This concept appears in the form of meditation and consists of two categories: physical body movement and mindfulness meditation.

The first category includes movement disciplines, such as Yoga, Tai Chi, or Qigong. The second category involves mindfulness meditation, mantra meditation or body scan meditation [7].

While these mindfulness practices appear mechanistically distinct, their effects often overlap so that they achieve similar effects. Maintaining focused attention on an object or physiological variable requires the ability to suppress attention outside influences. When applying these techniques, the meditator adopts an attitude of focused concentration and attention. This concept is thus referred to as mindfulness or mind-ful awareness. These actions elicit a physiological relaxation response that acts antagonistically to the stress response. Many of the physiological effects of mindfulness are clinically measurable and have been found to offer therapeutic benefits that help

build resilience for patients with PTSD and resolve addictive behaviours for patients with substance abuse or addictions, especially in areas such as brain function [8] and immune system function, attention and memory, self- and auto-regulation (including control of stress and emotions, anxiety and depression [7].

Western scholars and Buddhist scholars concur on the value of meditation for managing symptoms of PTSD and substance abuse. The Dalai Lama, the head of the Tibetan spiritual movement of Buddhists, agrees that the unity of all things begins in the mind. Tibetan monks have a particular interest in the workings of the human brain. They spend several hours a day in meditation and claim that this activity increases brain functionality, concentration and learning ability, especially with regard to memory. In "Training the Brain" we see the scientifically proven facts that mindfulness in the form of meditation plays a critical role in improving the performance of the brain and, in fact, can alter brain structure. The brain can be trained and modified in specific ways that bring about lifestyle changes and behavior modifications that considerably reduce post-traumatic stress [9].

To Tibetan monks, meditation is simply a way of everyday life. It is a regular exercise to control the brain and experience relaxation. However, scientific evidence shows that non-Buddhist patients with PTSD and addiction who use these techniques can also improve their brain performance and increase the amount of grey matter in their brains.

Contemporary Evidence for Mindfulness in PTSD and Addiction

Research suggests that when veterans with PTSD receive even a short introduction to mindfulness through meditation they may experience huge leaps in symptom resolution [10]. Underlying variations with regard to different aspects of mindfulness may make certain individuals more predisposed to developing PTSD. In a study that compared mindfulness in veterans with and without PTSD, those with PTSD consistently scored lower on tests for mindful non-judging. However, the two groups scored equally on a mind-full awareness scale, leading researchers to postulate that the two aspects of mindfulness occur in different brain areas, with mindful non-judging being a function of the medial prefrontal cortex, which inhibits the amygdala, while mind-full awareness is mediated through an unrelated neural network. Moreover, for a patient with PTSD, symptom resolution may rely more on the attitude associated with a memory than simply possessing mindful awareness of the memory [11].

In a Research study, statistically significant self-reported decreases in symptoms and improvements in quality of life in veterans with PTSD were noted within 8 twice-weekly treatment sessions [12]. A mindfulness-based cognitive therapy (MBCT) program adapted for patients with combat-related PTSD found clinically meaningful decreases in PTSD symptom severity. Particular areas of improvement included avoidance/numbing symptoms and tendency to self-blame. All participants had suffered from long-term PTSD (for more than 10 years) with the majority experiencing symptoms for more than 30 years. Additionally, many had previously gone through extensive psychiatric and pharmaceutical treatments [13].

A mindfulness-based stress reduction program that focused on fostering self-compassion was effective at regulating mood in veterans with PTSD who have difficulties with mood and emotion. The treatment improved overall mood and reduced negative ideation, dysfunctional attitudes, depression and anxiety. Physiological

symptoms including dizziness, depression, fatigue and tension were also reduced due to autonomic regulation effects of the practice. Researchers recommend the technique as being highly effective and cost saving, even when used for brief periods [14]. Female veterans with PTSD report greatly reduced recovery time from dissociative episodes following participation in a treatment protocol that combines massage, mindfulness and psychotherapy. The treatment has also been found to bring repressed emotions into conscious awareness, allowing them to be processed during psychotherapy [15].

PTSD that occurs concurrently with substance addiction is highly prevalent and poses particular treatment challenges. According to the U.S. Department of Veterans Affairs, in the general population, 46.4% of individuals with lifetime PTSD also meet criteria for substance abuse disorder. Though comparable epidemiological studies have not been conducted among veterans, the 1980 National Vietnam Veterans Readjustment Study found comorbid substance abuse disorder in 74% of Vietnam veterans with PTSD. Mindfulness training is yielding promising results for this group. In a recent study of veterans with comorbid PTSD [16] and alcohol use disorder, an 8-week mindfulness-based stress reduction program resulted in significant symptom reduction, with benefit retention in areas including depression, behavioural activation, acceptance and mindfulness at 6 month-follow-up [17].

Preliminary evidence shows that prescription opioid misuse among chronic pain patients may be managed or prevented through mindfulness training. Compared with support group therapy, a mindfulness-oriented recovery program resulted in significant reductions in pain severity and pain-related functional interference at 3-month follow-up [18]. Patients undergoing methadone maintenance treatment for opiate addiction received 8 group sessions of mindfulness training that involved focusing on present-moment changes in their thoughts and physical sensations and welcoming new thought patterns without expending effort to change or challenge old patterns. Post-therapy survey revealed higher scores on mental, emotional, physical and social quality-of-life scales compared to controls [19].

Risk of substance abuse relapse remains a prevalent problem following standard 12-step and psycho educational treatment programs. Mindfulness combined with cognitive-behavioural relapse prevention has been shown to provide superior benefits compared to conventional treatments. In one study, participants reported significantly fewer days of substance use and heavy drinking at 6-month and 12-month follow-up compare to a group that received treatment as usual [20]. Participants in one study of a mindfulness-oriented recovery enhancement program reported significantly improved general activity levels, mood, walking ability, relationships, sleep, and overall enjoyment of life compared to support group-based therapy, with psychological, though not physiological improvements persisting at 3-month follow-up [21].

Neuroscience of PTSD and Addiction

Scientific evidence proves that a considerable increase in activity of the left-anterior brain is directly proportional to positive feelings and this improves functionality of the immune system [22]. Davidson, et al. used this assumption in investigating significant activation of this part of the brain and its association with antibody titers after a shot of flu vaccine to participants completing a mindfulness course and those on the waiting list. The nature of increase in cortical activity had a directly

proportional relationship with increase in antibody titer. The mind and the body cannot be easily separated as shown in this experiment. The central and the peripheral processes have an interlinked functionality and the activity of one part affects the other [23].

Different types of meditation result in differences in brain activity. In an experiment by Lutz et al., robust long distance phase-synchrony and gamma band oscillation was recorded during generation of non-referential states of meditation. This research focused on the compassion state of meditation, though it is evidently clear that other forms of meditation would yield similar results. Essentially, this experiment corroborates and supports the thesis of this review article. First it answers that mindfulness is essential in affecting brain structural functionality and secondly, brain functionality is essential in studying resilience [24].

Contemporary Research has also demonstrated that our core sense of identity is deeply connected to our body identity. An area of the Brain called the "Insula" interprets body sensations and brings it into conscious awareness. Damasio et al have demonstrated decreased activation of the Insula and other areas related to self-awareness in persons who have experienced trauma [25].

Modern imaging techniques have provided a wealth of insight into the neurobiology of addiction. SPECT studies have found decreased serotonin activity via reduced SERT (Serotonin Transporter) availability in brainstems of alcoholics but similar SERT availability between heroin users and health controls. However, higher levels of SERT availability have been associated with increased likelihood of relapse, indicating potentially conflicting roles of serotonin in addiction [26].

PET studies have revealed reduced dopamine receptor expression in the striatum of drug addicts. Whether this represents a predisposing factor or compensatory reaction to chronic stimulant drug use is unknown at this time. Through 20 years of PET studies in the realm of addiction, a consensus has emerged that addiction generally results from a combination of pre-existing individual neurochemical risk factors, environment and drug exposure [27].

PET scans of cocaine users have shown that when severely addicted individuals view videos of cocaine using cues significant release of dopamine is observed in the dorsal striatum, leading to drug cravings. EEG scans confirm increased cortical activation in response to drug cue exposure in both alcohol and cocaine addicted individuals [28]. PET imaging has demonstrated that chronic smoking reversibly up-regulates the number of acetylcholine receptors in the brain. The amount of tobacco consumed by the average daily smoker results in nearly complete occupancy of one of the brain's most common acetylcholine receptors and which is responsible for nicotine-induced tolerance and sensitization [28]. Cigarette smoking also influences the brain's reward circuitry by stimulating dopamine release in the ventral striatum [28].

In cocaine addicted individuals, SPECT imaging shows decreased regional cerebral blood flow in the left and right caudoateral orbitofrontal cortex, bilateral superior temporal gyri and left middle temporal gyrus. It is thought that the orbitofrontal cortex exerts inhibitory control over on going behaviour, indicating its potential contribution to the inability of cocaine addicted individuals to predict the consequences of their actions, therefore hindering their ability to self-regulate behaviour [29].

MRI studies have revealed dys regulation in brain areas responsible for reward processing and cognitive control, notably the meso-limbic prefrontal pathway, in heroin users. Specifically, an inverse relationship is seen between sensation seeking behaviors and midbrain size [30] significantly lower white matter is often present in the corpus callosum, fornix, external capsule, superior longitudinal fasciculus, and cingulate gyrus of individuals with alcohol use disorders, as evidenced by fMRI. This imaging technique has also led to the discovery of a gender difference in alcohol effects on the brain whereby higher drinking frequency leads to greater neurotoxicity and lower white matter scores in women, but not in men [31].

Through the use of imaging technologies such as PET and fMRI, disruption of subcortical reward systems as the underlying reason for addiction has given way to new theories of prefrontal cortex involvement via its regulation of reward regions of the brain as well as its involvement in executive functions such as self-control and awareness. Hence, damage to the prefrontal cortex leads to compulsive drug taking, in part, via the individual's loss of free will [32].

Conclusion

In cultures throughout the world, meditative practices have been used for centuries by devotees seeking ways to integrate mind and body and gain awareness and understanding of their inner and outer worlds. Long shrouded in mystery and reserved for a small minority willing to undergo rigorous self-discipline over many years, abbreviated versions of these time-honoured traditions have been adapted for use in modern life, allowing practitioners to live and function in the modern world while receiving many of their life- and health-changing benefits.

As science catches up with tradition, sensitive imaging techniques enable the visualization of physiological changes as they occur in the brains and bodies of mindfulness practitioners, providing scientific proof where previously only empirical evidence existed. Armed with a growing body of evidence, pilot programs designed around mindfulness techniques, some of which have been customized to the particular needs of certain groups, such as veterans with PTSD and addiction, have met with resounding success.

The trend has even been labeled an "emerging phenomenon" by one researcher [33]. Some of the greatest benefits of mindfulness training have been seen in these populations, where the greatest need exists, and for which conventional drugs and psychotherapies have provided modest effects. Combining encouraging outcomes with the significant cost-savings and high safety profile of this low-tech therapy, it seems reasonable that mindfulness practices should continue to be integrated into mainstream treatment protocols in order to stem the growing tide of PTSD and addictions among veterans so that they may find hope, healing and joy in their lives.

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